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# OTOLITHS OF A NEW SCIAENID FISH (PISCES, TELEOSTEI) FROM THE ZONDERSCHOT SANDS MEMBER (MIOCENE) OF BELGIUM

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Several large otoliths of a sciaenid fish collected from two temporary outcrops of the Zonderschot Sands Member (Miocene) at Heist-op-den-Berg (Belgium) represent a new taxon, 'genus Sciaenidarum' *heistensis* n. sp. Its affinities are discussed and the stratigraphy of these outcrops is described.

Key words — Pisces, Teleostei, new taxon, Zonderschot Sands Member, Miocene, Belgium.

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## INTRODUCTION

As part of the Berchem Formation, the Zonderschot Sands Member was introduced by De Meuter & Laga (1976), who considered it to be of middle Miocene age. This view was followed by Huyghebaert & Nolf (1979). On the basis of planktonic foraminifera, however, Hooyberghs (1980, 1996) favoured an early Miocene (Burdigalian) age.

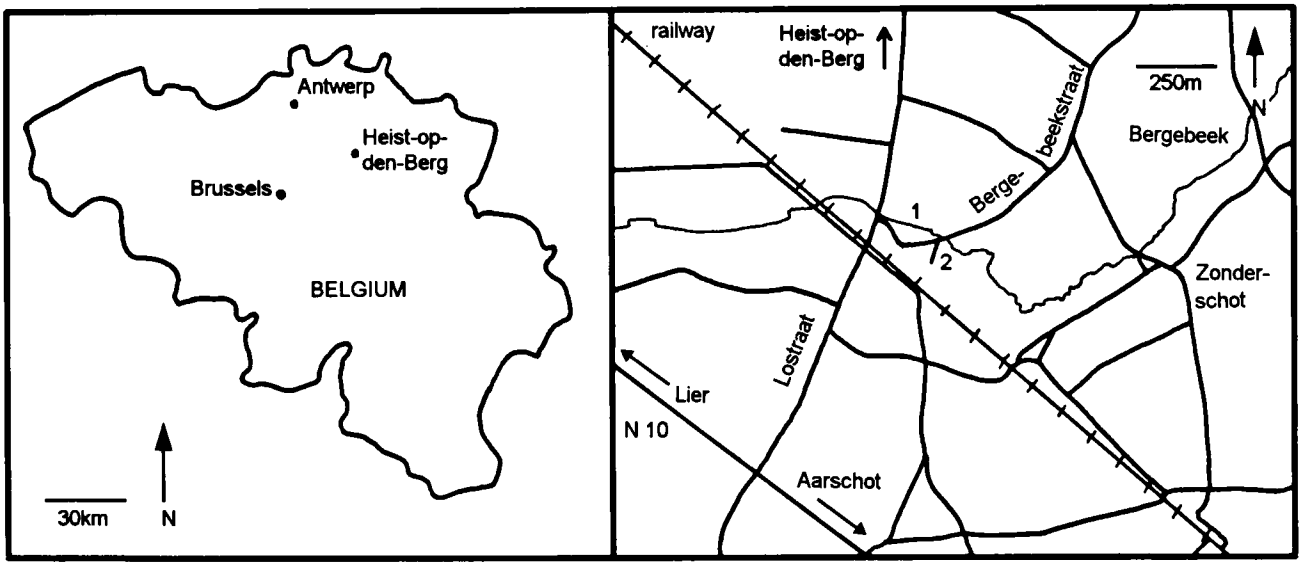


Fig. 1. Map showing the Lostraat (1) and Bergebeekstraat (2) temporary outcrops at Heist-op-den-Berg.

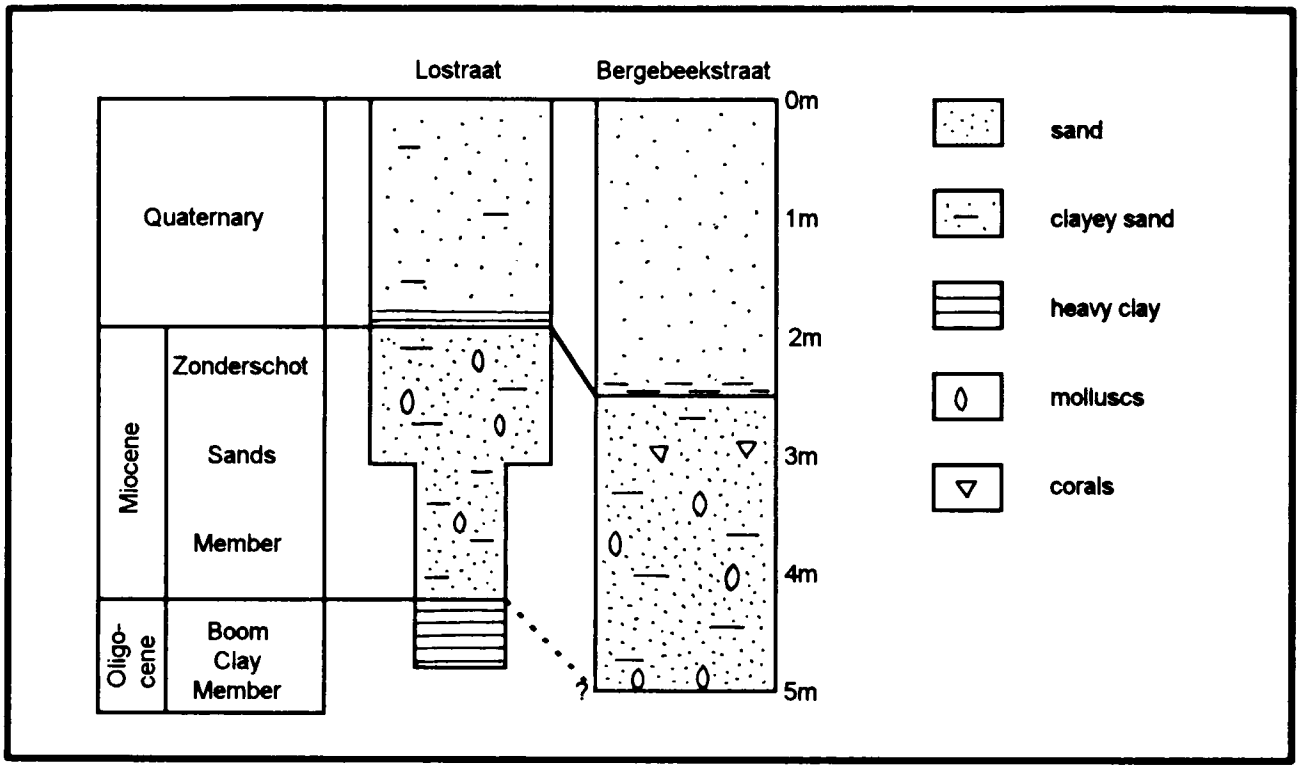


Fig. 2. Lithostratigraphy of strata exposed in the temporary outcrops at the Lostraat and Bergebeekstraat (Heist-op-den-Berg).

The otolith faunas of the Zonderschot Sands Member were described by Nolf (1977) and studied in detail by Huyghebaert & Nolf (1979), who recognised 67 taxa in their samples. In view of the fact that the remaining fauna was not considered at that time, members of the 'Belgische Vereniging voor Paleontologie (BVP)' undertook four excavations between 1989 and 1995 during which about 50 tonnes of fossiliferous sediment were wet-sieved. Samples taken for micropalaeontological analyses have recently been described by Hooyberghs (1996), and selected molluscan species collected from these temporary outcrops will shortly be published (Marquet, 1997).

## LOCALITIES AND STRATIGRAPHY

The Zonderschot Sands Member was exposed in the immediate vicinity of the type locality of that unit (co-ordinates, x = 176.520, y = 194.600) at the Lostraat and Bergebeekstraat, both alongside the Bergebeek, near the hamlet of Zonderschot (municipality of Heist-op-den-Berg, province of Antwerp) (Fig. 1). The co-ordinates (topographic map of Belgium, scale 1:25 000, sheet 24/1-2) of these localities are as follows:

Locality 1 (Lostraat): x = 175.775, y = 194.450
Locality 2 (Bergebeekstraat): x = 175.920, y = 194.330

Since the stratotype is known from a borehole only, the sediments encountered at these localities are described here (Fig. 2). Differences were noted during excavation and sampling: at the Lostraat the Zonderschot Sands Member was exposed to a depth of 3 m, the top of the unit lying at 2 m below surface. Sediments in this portion of the member are clayey and highly fossiliferous; they were exposed in three separate pits in 1989, 1991 and 1993. The top of the underlying Boom Clay Member (Oligocene) was reached in a borehole at 4.40 m below surface. The section between 3 and 4.40 m proved much less fossiliferous and much more clayey.

At the Bergebeekstraat, where a 5 m deep pit was dug, 2.5 m of Quaternary deposits were found to rest on the Zonderschot Sands Member, which was at least 2.5 m thick. Here strata were found to be more fossiliferous towards the bottom of the pit (where a thin mollusc layer occurred) and less so towards the top where a thin layer of the coral *Flabellum* sp. was present. Bulk samples were taken from the lowermost two metres only. On account of extreme ground water conditions, the Boom Clay Member could not be reached in this pit.

— Lostraat section (in metres below surface):

| | |
|---|---|
| 0.00-0.50 | Recent soil |
| 0.50-1.05 | slightly clayey brown sand |
| 1.05-1.65 | slightly clayey green/light grey sand |
| 1.65-2.00 | heavy green clay |
| 2.00-3.00 | dark brown, clayey, glauconitic sand with shells and frost wedges |

| | |
|---|---|
| 3.00-4.40 | very clayey, dark brown glauconitic sand with few shells |
| 4.40-4.50 | heavy grey clay |

— Bergebeekstraat section (in metres below surface):

| | |
|---|---|
| 0.00-0.80 | Recent soil |
| 0.80-1.85 | brown sand |
| 1.85-2.50 | green clayey sand |
| 2.50-2.80 | light brown sand with shells, shell hash and frost wedges |
| 2.80-2.90 | layer of corals (*Flabellum* sp.) and shells in light brown, slightly clayey, glauconitic sand |
| 2.90-4.90 | dark brown clayey, glauconitic sand, rich in dispersed shells |
| 4.90-5.00 | layer of shells in dark brown clayey, glauconitic sand |

The otoliths described in the present paper were collected from the 2.00-3.00 m interval at the Lostraat, and from the 2.90-4.90 m interval at the Bergebeekstraat.

## SYSTEMATIC PALAEONTOLOGY

### **'genus Sciaenidarum' heistensis** n. sp.
Pl. 1

*Diagnosis* — This species is characterised by slender, elongate otoliths with a thin anterior portion and a rather massive posterior part. This last feature becomes more prominent in older specimens. The inner face is markedly convex in the antero-posterior direction and nearly flat in the dorso-ventral direction. The ostium is wide and covers nearly the entire anterior half of the face. The cauda is straight for about two thirds of its length; its posterior end is markedly bent towards the ventral rim, but without recurving anteriorly. The area between this curved portion and the posterior part of the ostial crista inferior shows a rather elongate rectangular shape.

*Types* — Holotype is IRSNB P 7094; paratypes are IRSNB P 7095 and P 7096, all in the collections of the Institut royal des Sciences naturelles de Belgique (IRSNB), Brussels; other specimens are in the author's private collection.

*Derivatio nominis* — After the town of Heist-op-den-Berg.

*Locus typicus and stratum typicum* — Lostraat temporary outcrop (Zonderschot, Heist-op-den-Berg), Zonderschot Sands Member (Berchem Formation, early or middle Miocene).

*Material* — Thirteen complete specimens and several fragments with the anterior tip broken off.

*Dimensions* (in mm) —

| | length | height | width |
|---|---|---|---|
| IRSNB P 7094 | 16.5 | 4.5 | 5.0 |
| IRSNB P 7095 | 14.0 | 4.0 | 5.0 |
| IRSNB P 7096 | 22.0 | 6.5 | 7.0 |

*Affinities* — The Zonderschot Sands Member has yielded otoliths of three sciaenid taxa (Huyghebaert & Nolf, 1979), viz. *Argyrosoma* sp., *Umbrina* sp. and 'genus Sciaenidarum' *teutonicus* Weiler, 1942. As will be discussed further below, the present material does not belong to the genus *Argyrosoma* De la Pylaie, 1835, and the otolith of *Umbrina* s p. is much more clearly bent in the anteroposterior direction and is much higher than the new species described herein. However, its state of preservation is such that further comparison is difficult. 'Genus Sciaenidarum' *teutonicus* does not have slender otoliths, the ostium is much smaller and deeper whereas the cauda has a marked crista superior and is not so clearly bent as in 'genus Sciaenidarum' *heistensis*. Schwarzhans (1993, p. 12) placed 'genus Sciaenidarum' *teutonicus* in the Acropomatidae, but comparison with otoliths of Recent acropomatids and sciaenids [*Cynoscion striatus* (Cuvier, 1829) and *Seriphus politus* Ayres, 1860] shows that it is a true sciaenid, of indeterminate generic status.

Radwanska (1992, pp. 265, 266) recorded a juvenile sciaenid otolith in open nomenclature, 'genus Sciaenidarum' sp., from the middle Miocene of Poland, which is completely different from the Belgian specimens, being very round, high and convex and with a short ostium and an entirely different cauda.

The otoliths of 'genus Sciaenidarum' *heistensis* show a superficial resemblance to otoliths of the genus *Cynoscion* Gill, 1861, in which extreme elongation is also observed in a number of species (see Chao, 1978, p. 17; Sasaki, 1989, p. 79; Schwarzhans, 1993, pp. 36-51 for illustrations of comparative Recent material). In *Cynoscion*, however, the posterior portion of the outer face never shows such a strong thickening and the posterior end of the cauda always presents a more or less circular widening. There is also some similarity to representatives of *Atractoscion* Gill, 1862 (see Schwarzhans, 1993, pp. 56, 57 for illustrations of comparative Recent material), but in otoliths of this genus the inner face is always strongly convex in the dorso-ventral direction and the posterior end of the cauda is recurved anteriorly. A third otolith type showing a certain similarity to those described here has been documented in *Argyrosomus* (see Chaine, 1938, pl. 9; Trewavas, 1977, p. 485; Schwarzhans, 1993, pp. 137-139 for illustrations of Recent material), but in this genus the otoliths have a much stronger recurved posterior part of the cauda. In addition, the area between the reflexed portion of the cauda and the posterior part of the ostial crista inferior is high and very narrow in the antero-posterior direction.

Otoliths of the three genera mentioned above are of the elongated type, but their resemblance to the 'genus Sciaenidarum' *heistensis* is only a superficial one. For that reason, it is impossible to infer close affinities between these and the fossil species, which is why the latter is left in open generic nomenclature.

*Occurrence* — At present, the new species is known from the type locality only.

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## PLATE 1

Figs 1-3. Camera-lucida drawings of the holotype (1a, b: IRSNB P 7094) and paratypes (2a, b: IRSNB P 7095 and 3a, b: IRSNB P 7096) of 'genus Sciaenidarum' *heistensis* n. s p., Zonderschot Sands Member (Berchem Formation, early/middle Miocene), Heist-op-den-Berg.

PLATE 1